

REMARKS

Claims 1-8 are pending in this application. By this Amendment, claims 1 and 3-8 are amended. Support for the amendments can be found, for example, in the specification at page 2, lines 20-36; page 6, line 33-page 7, line 7; and Figs. 1, 2A and 2B. No new matter is added.

In view of the foregoing amendments and the following remarks, reconsideration and allowance are respectfully requested.

I. OBJECTION TO THE CLAIMS

The Office Action objects to claims 1-8 due to informalities. By this Amendment, claims 3-8 are amended for grammatical corrections. Accordingly, reconsideration and withdrawal of the objection is respectfully requested.

II. REJECTIONS UNDER 35 U.S.C. §112, SECOND PARAGRAPH

The Office Action rejects claims 1-8 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite. Applicant respectfully traverses the rejections.

Specifically, the Office Action asserts that various features of claims 1 and 8 are indefinite, that claims 2-7 are indefinite based on their dependence from claim 1, and that "the position" in claim 7 has insufficient antecedent basis. Without conceding the propriety of the rejections, by this Amendment, claims 1, 7 and 8 are amended in view of the Examiner's comments. Applicant respectfully asserts that the amendments obviate the rejections. Accordingly, reconsideration and withdrawal of the rejections are respectfully requested.

III. REJECTION UNDER 35 U.S.C. §102

The Office Action rejects claims 1-5, 7 and 8 under 35 U.S.C. §102(b) over WO 02/089244 to Ibrahim ("Ibrahim"). Applicant respectfully traverses the rejection.

By this Amendment, claim 1 is directed to a fuel cell system comprising, *inter alia*, a first supply passage and a second supply passage, wherein the first supply passage is

connected to a first anode manifold and the second supply passage is connected to a second anode manifold; and claim 8 is directed to a method of supplying fuel gas to a fuel cell system comprising, *inter alia*, a first supply passage and a second supply passage that supply fuel gas to the anode, wherein the first supply passage is connected to a first anode manifold and the second supply passage is connected to a second anode manifold. Applicant respectfully asserts that Ibrahim fails to disclose at least the above features of claims 1 and 8.

Instead, Ibrahim discloses a fuel cell system having merely one manifold, as illustrated in Figure 1 (Ibrahim, Fig. 1). With reference to Figure 1, two fuel supply ports, **12** and **13**, are located at opposite ends of a single manifold **15** (Ibrahim, paragraph [0021]). Fuel gas is supplied through a supply line **18** to a switchable valve **19** that is controlled by output signals from a controller **20** (*Id.*). Controller **20** controls the valve **19** to switch the supply of gas to either: (1) a first supply line **21** leading to port **12**; or (2) a second supply line **22** leading to port **13** (*id.*). Aside from a short amount of time when the valve **19** is changing between these two positions, only one supply line operates at a time, each through the same path in the fuel flow channel (Ibrahim, paragraph [0006]). Thus, by design, both ends of Ibrahim's manifold **15** are connected to a hydrogen supply passage and both fuel supplies essentially meet at a dead end inside the manifold **15** (*Id.*)

Conversely, the fuel cell system recited in claim 1 has two anode manifolds, or chambers having several outlets to or from other channels, wherein each of the anode manifolds are connected to one of two hydrogen supply passages, **30** and **32**, each supply passage in turn connected to two supply openings, **31** and **33**, respectively (see specification, Fig. 1). With reference to Figure 1 of the specification, valves **22** and **23** serve as the flow amount controlling valves for supply passages **30** and **32**, wherein valve **22** is controlled by signal **S11** and valve **23** is controlled by signal **S12**, each signal originating from the engine control unit **40** (see specification p. 6, lines 44-51; and Fig. 1). These signals indicate the

opening degree amount to be set by each valve (*Id.*). In addition, hydrogen exhaust passage 34 is connected to hydrogen supply passage 32, with valve 24 serving as the exhaust controlling valve for the exhaust passage 34, controlled by signal S1 (see specification p. 7, lines 15-20).

Figure 2A of the specification depicts the flow of hydrogen when valves 22 and 23 are open and valve 24 is closed (see specification Figure 2A). As illustrated in Fig. 2A, the hydrogen 50 splits into hydrogen passing through: (1) supply passage 30; and (2) supply passage 32, each of which flows into the anode from openings 31 and 33 (see p. 8, lines 8-27). As a result, two-way flows occur in opposite or counter directions (see p. 8, lines 24-27). In addition, Figure 2B of the specification depicts the flow of hydrogen when valves 22 and 24 are open and valve 23 is closed (see specification Figure 2B). Here, hydrogen flows only through valve 22 whereas impurities are discharged from supply opening 33 (see specification p. 8, lines 28-37). Thus, in view of the foregoing, the two anode manifolds of the present fuel cell system, each with multiple outlets to or from other channels and each connected to one of two hydrogen supply passages, 30 and 32, is entirely different from the system of Ibrahim, with merely a single manifold 15 in its design.

It is well settled that a claim is anticipated only if each and every element as set forth in the claim is disclosed, either expressly or inherently, in a single prior art reference (*see* MPEP §2131). Based on the above, Applicant asserts that Ibrahim fails to disclose at least a fuel cell system or a method of supplying fuel gas to a fuel cell system comprising a first supply passage and a second supply passage wherein the first supply passage is connected to a first anode manifold and the second supply passage is connected to a second anode manifold, as recited in claims 1 and 8. Instead, Ibrahim discloses a fuel cell system comprising only one manifold wherein both ends of the anode manifold are connected to a single hydrogen supply passage 18.

For at least these reasons, Applicant asserts that Ibrahim fails to disclose, expressly or inherently, each and every feature of claims 1 and 8 and, thus, does not anticipate claims 1 and 8. Claims 2-5 and 7 variously depend from claim 1 and are likewise not anticipated. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

IV. REJECTION UNDER 35 U.S.C. §102/§103

The Office Action rejects claim 6 under 35 U.S.C. §102(b) or, in the alternative, under 35 U.S.C. §103(a) over Ibrahim. Applicant respectfully traverses the rejection.

Claim 6 depends from claim 1 and, therefore, incorporates all of the features of claim 1. Thus, the deficiencies of Ibrahim with respect to claim 1, as discussed above, are applicable to claim 6. Further, Applicant asserts that Ibrahim provides no reason or rationale for one of ordinary skill in the art to have modified the fuel cell system disclosed therein to include the above-mentioned features of claim 1, without the benefit of Applicant's specification.

In particular, it would not have been obvious to one of ordinary skill in the art to have modified the fuel cell of Ibrahim to have included two anode manifolds at least because neither Ibrahim nor the Office Action provides any reason or rationale for such a modification. Further, Ibrahim is directed to a fuel cell system that allegedly reduces variations in the concentration of fuel gas flowing through a channel by alternating the flow of fuel in opposite directions, but in the same path and in the same channel (Ibrahim, paragraphs [0005] and [0007]). In contrast, the present application is directed to preventing the accumulation of impurities at various locations in the fuel cell stack and improving fuel efficiency by designing a fuel cell system to have a first and a second supply passage connected to a first and a second anode manifold, with an exhaust passage connected to the second supply passage (see specification, page 2, lines 14-36; and page 3, lines 33-46). However, there is no reason or rationale provided in either Ibrahim or the Office Action that

two anode manifolds connected each to a hydrogen supply passage can or should be provided in a fuel cell system.

In view of the foregoing, it would not have been obvious to one of ordinary skill in the art to have modified Ibrahim to have included two anode manifolds without the benefit of Applicant's specification, and cannot reasonably be considered to have suggested all of the positively recited features of claim 1. Thus, Ibrahim would not have rendered claim 1 obvious. Claim 6 depends from claim 1 and likewise would not have been rendered obvious. Accordingly, reconsideration and withdrawal of the rejection is respectfully requested.

V. CONCLUSION

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the claims are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



James A. Oliff
Registration No. 27,075

Sarah Lhymn
Registration No. 65,041

JAO:SQL/scg

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OLIFF & BERRIDGE, PLC
P.O. Box 320850
Alexandria, Virginia 22320-4850
Telephone: (703) 836-6400

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